

CLAIMS

What is claimed is:

1. A fuel cell system comprising:
 - a fuel cell having a housing enclosing an anode chamber, a proton exchange membrane and a cathode chamber, the cathode chamber being separated from the anode chamber by the proton exchange membrane, the housing adapted to transfer waste heat of the fuel cell;
 - a cathode supply line coupled to a supply of compressed oxygen-containing gas and to the cathode chamber;
 - a fuel supply coupled to the anode chamber;
 - a cathode exhaust gas line;
 - a heat exchanger coupled to the fuel cell for receiving waste heat of the fuel cell; and
 - an expansion turbine,the cathode exhaust gas line fluidly connecting the cathode chamber and the expansion turbine, the heat exchanger being thermally coupled to the cathode exhaust gas line between the cathode chamber and the expansion turbine, whereby the heat exchanger transfers heat energy from the fuel cell to cathode exhaust gas flowing through the cathode exhaust gas line.
2. The fuel cell system of claim 1, wherein the expansion turbine is coupled to the fuel cell for transfer of heat energy from the fuel cell to cathode exhaust gas in the expansion turbine.
3. The fuel cell system of claim 2, further comprising a combustor assembly coupled to the heat exchanger and the expansion turbine for transfer of heat energy to the cathode exhaust gas.
4. The fuel cell system of claim 1, further comprising a combustor assembly coupled to the heat exchanger for transfer of heat energy to cathode exhaust gas flowing through the cathode exhaust gas line.
5. The fuel cell system of claim 1, further comprising a cathode exhaust gas cooler and water separator fluidly connected between the cathode chamber and the heat exchanger.